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ABSTRACT

The studies described in this paper were undertaken to evaluate the usefulness of information-exchange techniques for promoting the quality of life within given regions of a society. The first analysis describes the investigation of projects to enhance the functions of small businesses, joint regional planning, health care, education, communciation for the hardicapped, and energy use in the area of Lulea, Sweden. Conclusions describe the basic characteristics of information distribution as a means of promoting regional development. The second study summarizes the findings of a report, "Telecom 2000," made by the National Telecommunications Planning Branch (NTP) of the Australian Telecommunications Commission. Activities of the NTP, public response to "Telecom 2000" recommendations, and ongoing actions are outlined. (KS)

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CURRENT WORK ON TELECOMMUNICATIONS POLICIES AND STRUCTURES

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TELECOMMUNICATIONS AND REGIONAL DEVELOPMENT IN SWEDEN

Background

Access to information can be seen as a fundamental resource in society: a resource of which the value is today increasing rapidly. Not only does this relate to efficient mass communication system, but also to the increasingly interesting new forms of two-way communication that computer technology now makes available and which will soon be economicably viable.

There is no longer a sharp distinction between mass communication and selective or personal communication. The availability of technologies such as computer conferencing and of systems like Viewdata wipes out many of these former differences, especially considering the wide family of input/output equipment that can be used. The home facsimile printed newpaper is one of these technological achievements that - when it comes - will undoubtedly lead to a revolution in information distribution.

The kinds of information that the new computerized media will be able to transmit are numberless. There is simply no limit. In fact, the concept of information seems to be of primary importance: it can be seen as a resource that in a macro perspective may even rate above economic resources and above raw material resources. You have to exchange information before you can get down to business. (Possibly there is a hidden hen and egg problem here). "Information power" is increasing and with it the usual planning and distribution possibilities and problems.

The studies described below were undertaken to shed light on the use of information power to promote the life of regions within a society. Although these studies are so far quantitatively limited, the principles behind their thinking should be of general interest in many environments.

Regional Analysis

In Sweden early in 1975 the question was posed:

> "Do information and telecommunication aids exist that can be used to promote a desirable regional development and improved regional balance?"

A small public body was formed to investigate this question, a body that was expected to put forward in short time suggestions for continued work and practical experiments. The work was to be a kind of partial technology assessment study, where the technological bounds and restrictions were minimal.

The problem was primarily to try to define social development needs, and ask whether these needs call for some kind of expanded communications technology, and if so, if telecommunications can be of interest. This kind of assessment is socially motivated, and is not emphasised in all countries.

The body consisted of members from the National Swedish Board for Technical Development, the National Telecommunications Administration, the Expert Board for Regional Development (Ministry of Labour), the Secretariat for Future Studies (Cabinet Office), and the Swedish Association of Local Authorities.

The conclusion was quite rapidly reached that in technology application environments like the one here in question, the particular choice of technology is in itself not the primary problem. This can be said although investments in, for example, new cable systems in rural areas of course are very resource-consuming. The primary task instead turned out to be to solve the difficulties in defining the information needs in the regional areas under study.

Furthermore, these information needs have to be considered locally; they cannot be defined by central authorities without close practical contacts within the region concerned.

Thus, the working group by the beginning of 1976 completed a Contact Report for the consideration of potentially concerned local authorities and concerned parties, before any definite suggestions about enlarged telecommunication systems were put forward.

In the report possible measures were discussed where telecommunication aids could help, in the following areas:

- employment
- living
- transport
- education
- health service
- other social services
- social communion
- culture and leisure activity
- external environment

In a joint action with the central regional authorities in Sweden a number of regions were selected as possible geographical areas for further study. This list concentrated on regions that were already considered as important from regional policy viewpoints.

The Contact Report was sent for consideration to representative authorities for these selected regions which were given two months time to respond. This rather short period was chosen since it

was clear to the project administration that only preliminary operational responses could be expected in this phase of the project. An interesting number of replies were received.

Priorities

A considerable amount of emphasis was given to the method to be used in order to define further project concentration. It was evident that more or less theoretical discussions on the basis of only written documentation about possible project development directions, would be insufficient. This would provide a too limited local response.

On the other hand, fairly complete practical system tests in full scale environments would be very resource consuming, and at the same time make possible only a limited applications flexibility.

A compromise was chosen on the way towards full scale assessments. A priority discussion period was arranged in the selected region, with a priority seminar lasting for one week early in December 1976, in the town of Lulea in the very north of Sweden. The seminar contained a number of discussion possibilities, with broad local representation in various fields of application interest.

In general the seminar sessions lasted half a day, followed by practical exercises of certain application systems. In some cases an "interactive" form between these two seminar components was used.

The seminar sessions covered the discussion of local communication needs in the following fields:

- collective traffic
- consumer information distribution
- planning by local authorities
- local citizen information
- planning of physical living conditions
- efficient use of consultants
- factual business contacts between firms and markets
- computer aided and distributed education
- co-operative decisions-making
- planning of local employment
- health systems communication
- communication between the handicapped

The seminar participants had the opportunity to experience and use technical systems from the following list:

- teleconferencing
- computer aided education systems
- social question/answering computer application systems:
    - o health information and planning
    - o psychiatric care
    - o consumer information
    - o planning of employment

- telephone conferencing
- telefaximile services
- picture telephone and others

Project Planning

The discussions in Lulea gave birth to an interesting number of project possibilities. Some of these, however, had to be abandoned because of lack of organizational and human resource support. A firm organizational structure is a necessity for project success in a living environment. Such a structure naturally includes as an important part a dependable assessment resource, something that - as it turned out - is not immediately or easily defined.

As a matter of fact, the definition of organization for the expecially interesting projects turned out to be a dominant factor. The importance of stability and local support can hardly be over-emphasized. It is probable that some initially perhaps over-optimistic telecommunication projects outside Sweden owe their fairly slow development rate to organizational difficulties. A successful project in this area simply has to be wanted by someone: it has to be of primary concern to a sufficient number of local parties involved.

It is interesting to note that the Lulea week created several project ideas outside the original application framework. For example, a local representative asked "couldn't our need for communication in this (other) field be helped in a similar manner?" As a result, a number of ideas developed that had not been envisaged in the early planning phases. Such creativity was a stimulus to interesting developments in the projects.

During the early months after the Lulea discussions, the precise nature of the suggested projects was further investigated. Some of these then turned out to lack sufficient stability. Others were considered to be too heavily resource consuming. New project ideas along the same lines of interest also emerged.

A number of projects have now been selected for implementation, which are, however, looked on as only the first of many possible steps forward. The work is likely to continue. The present projects are the following:

1. Promotion of local small-scale business

This project deals with increased interaction within small firm conglomerates, aiming at giving small scale business firms in peripheral locations some of the advantages of resource-sharing (external economies), normally confined to larger, and more dense, urban centres. Examples are joint sharing of resources for expert consultancy, new product testing equipment, documentation files, files of potential customers and suppliers within the region covered, etc.

Also involved is sharing of experience by direct interaction between the firms and by interaction with university researchers.

2. Joint planning for northern Nordic regions

This project will link together planning resources for the very northern regions of Sweden, Norway and Finland (the so-called Nordkalotten districts.) By using efficient telecommunications means, increased efficiency is expected from the joint use of resources of different kinds.

3. Health care

Here considerable experience already exists of different levels of computerized information services. The present project focusses on certain information distribution aspects in rural environments.

Two different approaches are taken. Firstly, the local planning of "mobile nurses", so-called "home first-aiders", is to be made efficient with the use of portable terminal access to advanced computing resources.

Secondly, resource-pooling of specialist knowledge is planned between different regional hospitals. The more distant hospitals often lack specialist knowledge in important fields. It has happened that the required knowledge on difficult time-critical medical problems has not been available at the right moment, but only a day or so later. Highly efficient telecommunications nodes, to be used to reach a limited number of specialists, will give far-away hospitals immediate access to knowledge centres in many fields.

4. Distributed education

Discussion has been held on the different models of education distribution with the help of telecommunications. It is thought that complex systems of the type usually called computer-aided-instruction (CAI), involve at the moment a too heavy systems investment, (although interesting CAI research results are at the moment under practical test in Sweden).

5. Increased communication for the handicapped

A project has been defined with the aim of increasing the communication possibility for groups of individuals with impaired hearing. With the help of computer supported typewriter terminals it is expected that valuable and new communication patterns will become possible. An especially interesting possibility is for "outside" persons to join the groups from time to time to supply active information from the outside news, cultural events, possibilities for expanded contacts etc. Thus, dynamic "windows" to the outside can be created.

6. Telecommunications and energy consumption

A special study is being undertaken with the aim of throwing light on the possibilities of energy reduction through the use of telecommunications as a substitute for travel. The study especially investigates the interplay between actual travel parameters, and the possibility of replacing individuals' physical travel by a qualified use of telecommunications. Indirect effects on regional development are also studied.

A further area of discussion concerns the so-called "paperless office" and the possibilities of working at home. So far however only limited information has been documented in this field.

Conclusion

The analysis of information distribution as a means to promote regional development in Sweden can be said to have the following basic characteristics:

1. The promotion of regional development is seen as the dominant factor, to which technical solutions are to be identified and implemented.

2. Information access and availability are given high priority, which leads to concentration on two-way narrowband technology.

3. An incremental project nature is stressed, where an early start in limited projects quantities is given priority. This flexible approach stresses user influence and local initiatives.

4. An initially somewhat scattered pilot project family is planned to be concentrated in a further phase, when emphasis is to be put on two to three especially important project areas.

5. As the work continues, concentration makes it possible to apply more and more rigorous methods for social assessment of the development. All kinds of measurable side-effects will be taken care of.

6. The projects are in the initial phases totally governmentally funded. Later on, the possibilities of joint private/public funding will be investigated, while still ensuing the important social communication characteristics of the whole activity.

These regionally oriented efforts are intended to expand knowledge about the information power and possibilities in society. One may consider questions such as, "Is information society regional?", concentrating on the local needs for communication in society. It might well be that our future communication systems will contain primary parts of a more and more local nature. This is to be a subject for thorough investigation in the future.

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CURRENT WORK ON TELECOMMUNICATIONS POLICIES AND STRUCTURES

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Introduction

In 1973 a special telecommunications planning group was established in the (then) Australian Post Office (APO). (In June 1975 the newly formed Australian Telecommunications Commission, trading as "Telecom Australia" took over the telecommunications activities of the APO). The special group was called the National Telecommunications Planning Branch (NTP), and was given a charter to identify future community telecommunication needs and make policy recommendations to management and government.

The APO had a well established tradition of telecommunications planning, with a large professionally led staff. The primary emphasis of the planning was,on technical aspects and Australia, as a result, has a modern and effective telecommunications network. However, in the early 1970's there was a growing recognition within the organisation that telecommunications technologies were developing very rapidly. Also noted was the increasing speculation by futurologists about new generations of telecommunications media which would have a similar impact on the society of the twenty-first century as the telephone had on the society of this century.

We were aware that in Australia there was a burgeoning network of broadband coaxial cables, provided for conventional telecommunications traffic, but which could support only limited numbers of subscribers' broadband services. Further, data services for business subscribers were increasing in numbers very rapidly; the emergence of householders' data services could require major resources and new planning approaches. The introduction of the Bell 'Picturephone' in the U.S.A., coupled with talk about 'the wired city', 'the information based society' and 'the post industrial society' served to heighten the uncertainties. Guidelines were required to make the transition to this glowing future as free of uncertainty and as efficient and effective as possible.

This then was the background to the establishment of NTP. It was recognised that the emergence of new telecommunications related in some way to social factors, and also that new communications media could become woven into the fabric of society, influencing the directions of social change, just as the telephone has done. Accordingly, the NTP team was not established as a solely technical planning group, but included people with social science, marketing research, and economics backgrounds in addition to engineering. The team members interacted frequently via meetings and discussions in an approach to interdisciplinary decision making.

Institutional Factors

NTP's review of telecommunications was limited to matters which are, or might become, the concern of Telecom Australia. Telecom Australia provides public telecommunication network services within Australia. A separate body, the Overseas Telecommunications Commission, handles international traffic as it enters or leaves the national networks.

Telecom Australia is a large user of radio-frequency spectrum, but responsibility for regulating spectrum rests with the Government Department

of Posts and Telecommunications. One of Telecom Australia's interests in the future of broadcasting is that mobile radio services will be competing with broadcasting in future for VHF and UHF spectrum. Close co-operation will be required in future between various authorities to ensure that spectrum is used in the best interests of the community.

The responsibility for regulation of public broadcasting services rests with the Australian Broadcasting Tribunal. However, virtually all landlines used by broadcasters are provided and owned by Telecom Australia. Similarly, the Telecom Australia monopoly would extend to the provision and ownership of cables for cable television services. (This power has been waived by licencing for the very small number of cable TV systems existing in Australia at present - about 600 subscribers in total - operating in areas of poor television reception).

Thus Telecom Australia's long term concern with broadcasting (and printed news services) is not with the regulation or generation of message content, but with the prospect that an increasing demand for wired services could lead to a merging of the broadcasting and telecommunications media.

NTP Activities

The NTP study programme contained four main thrusts which proceeded more or less simultaneously:

- An examination of technological possibilities which would set the bounds of services which could become available in the latter part of this century. This examination would also assist R & D investment decisions.

- An examination of macro-economic and micro-economic factors which would limit the demand for services, or resources available for the production of new services.

- An examination of social factors which could point to future demands for service or the consequences of adoption of particular services.

- A series of public seminars to generate discussion with members of particular user groups about their perceived needs for telecommunication services in the future.

Early in the work it became apparent that neither conventional market research techniques nor the skills of social scientists could generate long range predictions of demand for new types of telecommunications service. On the other hand, the social sciences had developed some dynamic social models which could be an aid to forecasting - generating likely social trends which could be of significance to the planner of telecommunication services. Another allied technique was to identify 'leading-edge' social trends observable in current society, which may become the dominant trends of the future. In the event, the social science study programme led to conclusions and recommendations which appear to offer at least partial solutions to the dilemma of future uncertainty.

Early in 1976, the findings of the NTP group were presented as a report, Telecom 2000, to the management and commissioners of Telecom Australia. Because of the nature of many of the issues raised, the report was distributed

to the public, and comments invited. The report would be examined within Telecom Australia and final decisions reached only in the light of the public responses.

Summary of Telecom 2000 Report

The report surveyed technical, social, economic and financial aspects of telecommunications. Separate chapters were devoted to discussion on mobile services, cable TV, telecomputing, visual services and criteria for selecting services for development. Leaving aside the recommendations, some of the conclusions reached in the report were as follows:

- Information is playing an increasing role in developed economies. This is likely to lead to increased demands for transmission of non-voice information.

- The Australian economy is expected to have adequate capacity to support high levels of demand for new types of telecommunication service, if such demands eventuated.

- There is no justification in Australia for rushing in to develop expensive new broadband distribution networks using present-day technologies. There are rapid developments in relevant technologies and the demand for new services is very speculative.

- Optical fibre transmission seems a very important future technology for telecommunication purposes over both long distances and for end-distribution to subscribers' premises.

- Cable television does not appear to have the promise in Australia that overseas experience might suggest. There are significant differences in geographic and institutional factors.

- The telephone service is becoming increasingly important to people, and more of a social necessity than a few decades ago.

- Particular telecommunications technologies do not have inherent social consequences which can be studied in advance. The critical factor is the way in which society organises and uses technology.

- People cannot make meaningful decisions about the uses of new telecommunications technology without having had direct experience.

- Society is passing into a phase where change, uncertainty and questioning of established values will become more common than in the past. Organisations will have to adapt to these conditions to ensure long term survival. Many past strategies will not be adequate in future.

The main recommendations of the report are summarised below, grouped under eight headings.

(i) Telecom Australia's Relationship with Society

- Support the principle of open planning and try to achieve closer links with telecommunication users and society at large; explore the possibility of forming user representative groups, consultative bodies, and bodies to 'mediate' between Telecom Australia and community interest groups;

- Start on a planned programme of field research into advanced telecommunications services with an emphasis on user involvement and the social and psychological aspects of new services; advanced services should be introduced only after comprehensive trials.

(ii) Monitoring the Environment

- Support an on-going programme of interdisciplinary studies of future telecommunications;

- Strengthen the machinery to monitor the changing economic, social and technological environment and provide a focal point for Telecom Australia's involvement in national policies having telecommunications implications.

(iii) Monopoly and Competition

- In the interests of conserving national resources, Telecom Australia should retain its present monopoly of public common-carrier telecommunication systems, but examine the possibility of further introducing competition in appropriate areas.

(iv) Internal Organisation

- Further develop organisational structure and planning processes along decentralised lines, with progressive devolution of decision-making to regional and local levels.

(v) Marketing

- Sponsor studies to identify the broader social and economic benefits of telecommunications; in the provision of new services try to avoid widening social inequalities;

- Support the provision of new services which exploit the latent capabilities of the existing network, with early attention to facsimile, visual information services, and teleconference services;

- Introduce and actively market a public automatic mobile radio telephone service with full access to the telephone network.

(vi) Technology

- Give increased emphasis to studies of the network characteristics of existing plant to facilitate the most effective use of the present network for new services;

- Continue network studies on the rate of transition to digital technologies in transmission and switching; give priority to providing a digital transmission capability on routes with high data traffic potential;

- Sponsor a programme of research and development on optical fibre systems;

- Consider increasing the size of underground pipes for cable distribution.

(vii) Computer Communication

- Foster harmonious development of the telecommunications and computing sectors with particular reference to the development of mutually compatible technical standards and the safeguarding of individual freedoms;

- Support the principle of separating the ownership of public data communications and public data processing functions. (This, of course, is to ensure that the same authority does not control both the transmission of data and its processing).

(viii) Cable Television

- Physical transmission plant for cable television to be provided by Telecom Australia;

- Support the principle of separating the ownership and operation of cable television systems;

- New cable television systems to have a minimum capacity of 20 channels, with one channel being reserved for public access;

- Support the establishment of a high-level examination of the future relationships between public telecommunications and the mass media, with initial attention to outstanding aspects of cable television.

Public Response

As mentioned previously, the Telecom 2000 report was made available for public comment. About 20,000 copies of the report were distributed and this resulted in 210 written responses, of which 99 were little more than formal acknowledgements. Most of the remaining responses dealt with the report in some depth, ranging from substantial discussion to lengthy reviews. The written responses were supplemented by numerous discussions at seminars and with interested individuals. Of the 111 written responses with some discussion of the report, the sources were as follows:

Academics/students	41
Telecom Australia individuals and groups	9
Telecommunication industry	6
Computer industry	3
Banking industry	2
Other industry	8
Government bodies:	
Federal	6
State	7
Local	5
Libraries	4
Media	4
Social Service and Community Groups	4
Individuals	12

The level of written response, particularly from non-academic sources, supports the view that telecommunications planning matters are fairly low on most peoples' agendas. Most responses came from members of interest groups, and this suggests that open planning would, initially, be best implemented using interest groups rather than representatives of the public at large.

The predominant theme among the responses was concern over the social effects of telecommunications services, and particularly of the consequences of possible future services. Various approaches were suggested to avoid particular effects seen or foreseen by individual respondents, but there was a recurrent implication that the fault lay in Telecom Australia being preoccupied with supplying devices rather than the service they provide.

It is not surprising, therefore, that there was more opposition than enthusiasm for the new types of service employing 'high technology', described in the more technical chapters of Telecom 2000. Fears were expressed that sophisticated services could be provided only at high cost, which would have to be subsidised by the users of the ordinary telephone services. The feeling seems to be fairly common that the application of more technology is not the way to solve problems, either in the business world or in society. On the other hand, Telecom Australia was repeatedly urged to make the most of technologies that utilise the present network. Many respondents regarded a telephone in every home as a socially desirable objective.

Few responses made any significant reference to cable television, even though a chapter was devoted to it in Telecom 2000. Those that did were not concerned with television programmes, but with other wideband services that might be added, or with the comparative advantages of cable and radio for broadcasting.

Telecom 2000 had put forward the concept of open planning as a way of matching the development of new services to the needs of society. More responses commented on open planning than on any other matter. Although Telecom 2000 contained no recommendations on the means of implementation of open planning, the responses confirm that the need is growing for some form of consultation with the public on planning matters. Some respondents were very cynical about the recommendations that advocated open planning, and claimed that Telecom Australia was too closed, paternalistic, bureaucratically rigid and technically-oriented to allow any outside interference in decision making. Others were cautiously optimistic that open planning might be able to develop successfully. Almost all respondents thought that there would be serious obstacles to effective open planning. There would be a need for changes in attitude throughout Telecom Australia and society, and for a wider public understanding of telecommunications. One respondent envisaged (and, in the view of NTP, realistically) that, with an active and continuing programme of public education, a period of at least 10 to 15 years would be needed, during which open planning might gradually evolve to full effectiveness.

One important process by which Telecom Australia and the public might learn of the implications of new types of services, is field research. It was described in Telecom 2000 and welcomed by many respondents. This is a form of experimental programme, conducted jointly with selected communities, to determine how a new service might best serve the needs of customers and society. While some respondents regarded it as the appropriate marketing approach, there were also a few advocates for a policy of active selling. Indeed many respondents saw the chapters on further prospects and new technology in Telecom 2000 as part of such a policy, and the report was criticised for this. A further criticism concerned what was thought to be an attitude of 'growth for growth's sake'.

The monopoly position of Telecom Australia was broached several times in Telecom 2000. The stand taken in the report was that the present position in the provision, ownership and operation of the basic network should not be altered. (The control of telecommunications in Australia is similar to the British/European model). However, the report also recognised that there could be advantages in introducing competition in selected areas of telecommunications, and recommended that this subject be further explored. The relevant discussion and recommendations attracted a lot of comment, mostly in favour of some competition. A few respondents thought that the reasons given in support of a government monopoly were very dubious, but no one disagreed outright with the principle of the basic telephone network being a monopoly. Many users, strongly favouring relaxation in the policies applying to terminals and the use of leased private lines, thought that the chances of getting satisfaction would be very much greater if private industry were allowed to enter the field more freely. In this context, value-added networks were mentioned several times. It was suggested that an independent examination should be made into the merits of competition in areas other than the switched public networks.

Telecom 2000 had suggested that because of the continuing, or even increasing, reliance of society on information transfer, the proportion of national resources devoted to telecommunications would remain at the present level of about 4.5% of Gross Fixed Capital Expenditure (GFCE). However it mentioned the possibility of a somewhat greater proportion, up to 6% or even 7% of GFCE, if warranted by future demand. This was disturbing to some respondents, who either represented other sectors of the economy that would be competing for resources, or felt that such a proliferation of telecommunications would be socially undesirable. The social arguments referred either to the civil rights and privacy issue, or to the possibility that telecommunications would displace more personal means of communication.

Ongoing Action

The Telecom 2000 recommendations have been under study by line management in Telecom Australia. At the time of writing it seems likely that most recommendations will be accepted for immediate action or later action at an appropriate time. Some of the recommendations, such as 'open planning', will require further development of specific proposals before action can be taken.

NTP will continue operating as a policy research unit after all the actions flowing from the Telecom 2000 report are completed.

Conclusion

In conclusion it is appropriate to review the usefulness and effectiveness of the Telecom 2000 exercise, although it is not yet complete. Among the responses to the report there was widespread appreciation that the exercise had been attempted, and that Telecom Australia had made the report available for public study and discussion.

The report in its general approach and conclusions was a significant break with past tradition, and must have astonished many people in Telecom Australia. Nevertheless there is clear evidence that the underlying spirit of Telecom 2000 - awareness of social responsibilities - is now growing within the organisation. This has complemented a shift from production orientation to marketing orientation since vesting of Telecom Australia in 1975.

NTP was also one of the first policy research units established in Australia to deal with long range planning. The NTP experience may provide a model for other groups which will help Australia and perhaps other countries deal with the uncertainties of the future.

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